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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,563	01/20/2004	Jeroen Valensa	00655-1213US	1065

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EXAMINER	
RAHIM, AZIM	

ART UNIT	PAPER NUMBER
3744	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/760,563	VALENSA ET AL.	
	Examiner	Art Unit	
	AZIM RAHIM	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Valensa et al. (US 7,069,981) in view of Burch et al. (US 2003/0129108).

Regarding claims 1, 6 and 10, Valensa et al. disclose a reformate cooling system (figs. 1-3) for reducing the temperature of a reformate to within a desired temperature range for use in a fuel processing subsystem (see abstract), the fuel processing subsystem including a process water flow that supplies water to a fuel flow in the fuel processing subsystem (col. 1 line 37, water entering the system); the reformate cooling system comprising: at least one heat exchanger unit (30 or 50) to transfer heat from the reformate flow to a portion of a humidified air/methane mixture (col. 1 lines 41-47), the at least one heat exchanger including a coolant inlet (entrance 62), a coolant outlet (exit 64), a coolant flow path (flow path 56) to direct the portion of the humidified air/methane mixture from the coolant inlet to the coolant outlet (explicitly shown in fig. 3), a reformate inlet (entrance 68), a reformate outlet (exit 70), and a reformate flow path (flow path 58) to direct the reformate flow from the reformate inlet to the reformate outlet with a countercurrent flow relationship between the portion of the humidified air/methane mixture in the coolant flow path and reformate flow in the reformate flow path (explicitly shown in fig. 2), the heat exchanger having a sufficient effectiveness to fully vaporize the portion of the process water flow and bring the reformate flow and the portion of the humidified air/methane mixture toward a common exit temperature under normal operating conditions for the fuel processing subsystem (col. 7 lines 18-22); a valve (44) connected to the coolant inlet (via line 46) to control the flow rate of said portion of the humidified air/methane mixture to the coolant inlet (capable of relieving the pressure of the flow from "HUMID"); a temperature sensor (40) positioned to

measure an outlet temperature of the reformate (col. 2 lines 19-20); a controller (PID controller 42) connected to the temperature sensor and responsive thereto to selectively control the portion of the humidified air/methane mixture via the valve to regulate the common exit temperature to a desired temperature range (col. 2 lines 18-29); and an active control loop (the connection of the temperature sensor 40 and valve 44 to PID controller 42) to control the flow rate of the portion of the humidified air/methane mixture through the heat exchanger to maintain the common exit temperature within the desired temperature range (col. 2 lines 18-29, where this system is capable of performing the above limitation). Also note that the system inherently performs the method of operating a reformate cooling system.

Valensa fails to teach the limitation of using a process water flow to exchange heat with a reformate in a heat exchanger, which is configured to fully vaporize the portion of the process water flow, the flow of both the reformate and the process water flow being in a concurrent flow relationship.

Burch et al. teach the limitation of using a process water flow to exchange heat with a reformate in a heat exchanger [0036 lines 4-5], which is configured to fully vaporize the portion of the process water flow [0036 lines 4-12].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reformate cooling system of Valensa to include the use of a process water flow to exchange heat with a reformate in a heat exchanger as taught by Burch et al. in order to take advantage of the high latent energy of the water, thus providing a gradual change in temperature of the fluid being heat exchanged with the water, thus increasing efficiency.

Furthermore, the general concept of providing the flow of both the reformate and the process water flow being in a concurrent flow relationship falls within the realm of common knowledge as obvious mechanical expedient and is illustrated by Burch et al. which teaches the concept of exchanging heat between two fluids flowing in a concurrent relationship (illustrated in fig. 1 that heat exchanger 22 has two fluid flows entering on a same side and exiting on a same side), and one having ordinary skill in the art would have been motivated to include the use of the flow of both the reformate and the process water flow being in a concurrent flow relationship in order to prevent overcooling of the heat transfer fluid, thus increasing operating efficiency.

Regarding claim 2, Valensa et al. disclose wherein an auto-thermal reformer (26) receives the portion of the humidified air/methane mixture from the coolant outlet and mixes the portion of the process water flow with the fuel flow (col. 6 lines 11-16, in with humidified air/methane and out with reformate).

Regarding claim 3, Valensa et al. disclose wherein the temperature sensor (40) is positioned at the reformate outlet (explicitly shown in fig. 1).

Regarding claim 4, Valensa et al. disclose wherein the temperature sensor is positioned at the coolant outlet (col. 3 lines 42-49, where there would have to be a temperature sensor in order to compare the temperatures of both first and second fluid outlets).

Regarding claim 5, Valensa et al. disclose wherein the controller is electronically coupled to the temperature sensor (col. 2 lines 18-29).

Regarding claim 7, Valensa et al. disclose the step of adjusting the temperature range of the reformate exiting the first flow path in response to changes in catalytic activity in a hydrogen purification device receiving said reformate exiting the first flow path (col. 1 line 61 – col. 2 line 5, the catalytic activity in ATR 26).

Regarding claim 8, Valensa et al. disclose the step of recombining the portion of the process water flow with a remainder of the humidified air/methane mixture (fig. 1, where the line from "HUMID" splits into one line to heat exchanger 30 and line 46, each taking portions of the humidified air/methane mixture and recombining after the heat exchanger 30)..

Regarding claim 9, Valensa et al. disclose the step of transferring the recombined humidified air/methane mixture to an auto-thermal reformer (fig. 1, arrow to ATR 26)

Regarding claim 11, Valensa et al. disclose wherein the active control loop is a feedback control loop (the feedback of temperature sensor 40 and valve 44 to the PID controller 42, indicated by dotted line).

Regarding claim 12, Valensa et al. disclose wherein the active control loop includes a valve (44) to control the flow rate of the portion of the humidified air/methane mixture (explicitly shown in fig. 1).

Regarding claim 13, Valensa et al. disclose wherein the active control loop monitors the reformate outlet temperature (inherent due to the connection of the temperature sensor 40 and the PID controller 42).

Regarding claim 14, Valensa et al. disclose the coolant outlet being connected to an auto-thermal reformer (fig. 1, indicated by arrow from heat exchanger 30 to ATR 26).

Response to Arguments

4. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Azim Rahim whose telephone number is 571-270-1998. The examiner can normally be reached on Mon - Thu 8am - 4:30pm Est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached at 571-272-6681 or Cheryl Tyler at 571-272-4834. The

fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AR 3/13/2008

/Frantz F. Jules/

Supervisory Patent Examiner, Art Unit 3744